

Doc Code: AP.PRE.REQ

PTO/SB/33 (11-08)

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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)

S4-02P13029

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Application Number

10/533,813

Filed

May 2, 2005

First Named Inventor

Georg Bachmaier et al.

Art Unit

2834

Examiner

Bryan P. Gordon

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest.
See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)

☒ attorney or agent of record. 34956
Registration number _____

☐ attorney or agent acting under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/WERNER H. STEMER/

Signature

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Telephone number

APRIL 30, 2009

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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S4-02P13029

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applic. No.	:	10/533,813	Confirmation No: 4290
Applicant	:	Georg Bachmaier, et al.	
Filed	:	May 2, 2005	
Title	:	Method for Operating a Hydraulic Injection Valve having a Piezoelectric Actuator and a Control Unit	
Art Unit	:	2834	
Examiner	:	Bryan P. Gordon	
Docket No.	:	S4-02P13029	
Customer No.	:	24131	

Hon. Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Sir:

Applicants request review of the final rejection dated March 16, 2009. No amendments are being filed with the request. The request is being filed together with a Notice of Appeal.

The review is requested for the reasons stated on the attached sheets.

- **Remarks/Arguments** begin on page 2 of this paper.

**Argument in Support of
Pre-Appeal Brief Request for Review**

The only issue in this appeal is the obviousness rejection over the prior art. The claims have been finally rejected as being obvious over Mock (EP 1079158) and Kuwajima et al. (US 2002/0048124 A1, "Kuwajima") under 35 U.S.C. § 103.

The rejection is in error. Please consider the following:

The test in Graham v. John Deere Co., 383 U.S. 1 (1966), requires that we determine the scope and contents of the prior art. If we do not properly read the prior art teachings, the following steps in the test will likely be incorrect as well. Here, we submit that the secondary reference Kuwajima has been misinterpreted. As such, the patent examiner has failed to properly determine the scope and contents of the prior art.

The primary reference Mock has apparently been applied correctly (the reference, of course, relates to a predecessor of the claimed invention; please note the overlapping inventorship). There, there is disclosed a method for operating an injection valve with a housing and at least one piezoelectric actuator for generating a valve lift, a movable component, such as a valve needle, and an hydraulic element forming an hydraulic bearing for play compensation between the housing and the piezoelectric actuator. These components are disposed in series in force transfer terms.

Mock does not contain information relating to the biasing of an actuator. To "complete" the rejection, then, the Examiner introduced Kuwajima and combined the same with the primary teaching of Mock. A careful review of the secondary reference, however, turns up differences between the Examiner's statements and the actual reference disclosure. The Examiner has misinterpreted the reference.

To begin with, Kuwajima does not act in "the same field of endeavor" as Mock or the claimed invention. Office action, page 3. The secondary reference deals with

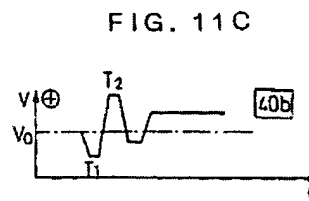
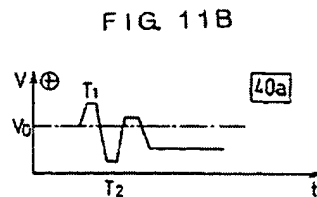
the positioning of a reading head in a hard disk drive. The claimed invention, in contrast, is directed to a "method for operating an injection valve," to a "control unit for generating a drive voltage for an injection valve," and to such a control unit in combination with a gasoline engine and a diesel engine.

It is most important, in the context of the claimed invention, to clearly understand the terms "bias" and "polarity" and carefully read the claims with that understanding in mind. The term "bias" means that a voltage is applied, resulting in a given electrical field. The term "polarity" refers to the direction of the voltage (+ or -) or the orientation of the resulting electrical field. The orientation is typically shown with vectors or simply with reference to the polarity of the underlying voltage (+ / -).

Kuwajima does not teach that a bias voltage should be applied to the piezo material that would then result in an electrical field (in the piezo material) pointed in an opposite direction as the preferred polarity of the piezo material. Notwithstanding the Examiners stated "interpretation" in the paragraph bridging pages 5 and 6 of the Office action, fact is fact and Kuwajima can only be understood in one way.

Reference is had to Figs. 11B and 11C in Kuwajima.

The voltage diagram of Fig. 11B pertains to one of the thin-film piezoelectric elements, while Fig. 11C pertains to the other one. The voltages are mirror symmetrical. The voltages, however, are in no case voltages that are opposite the polarity of the preferred polarity of either of the two piezo elements. The voltage level V_0 is not a zero value. Instead, the voltages 40a and 40b are both in the positive domain. Here, the "positive" domain is with respect to the preferred polarity of the respective piezo element.



Reference is further had to Kuwajima's disclosure on page 4, paragraph [0052] and on page 11, paragraph [0155]. The latter explains:

[0155] When the head 60 has a positional deviation from the target track . . . the voltage control is carried out in such a manner that, in period T, shown in FIG. 11B and FIG. 11C, the applied voltage to the first thin-film piezoelectric element 40a increases with respect to the bias voltage V_o and in synchronism with this, the applied voltage to the second thin-film piezoelectric element 40b reduces with respect to the bias voltage V_o . Thus, the head 60 is returned inside in the radial direction

Kuwajima, page 11, paragraph [0155] (emphasis added). It is thus clear that the reference teaching does not reverse the polarity between the times T1 and T2 and that the voltage V_o is only a bias voltage (raised above zero) but not a reverse voltage.

Kuwajima's bias voltage only serves the purpose to prevent an electric field that would oppose the preferred polarity of the piezo elements. If anything, the reference quite teaches against appellants' claimed solution. In either case, Kuwajima does not fairly suggest expanding the useful range of the piezo element with regard to the maximum deviation (i.e., stroke) that may be achieved.

Claim 11, by way of example requires a step of "biasing the actuator with a bias voltage having a polarity opposing a preferred polarity of the actuator, to thereby cause a preliminary contraction of the actuator." The drive voltage, which is then applied in a step as recited in the following paragraph of claim 11, has a polarity that corresponds to the preferred polarity of the actuator. In other words, the bias voltage has a polarity that is the opposite of the polarity of the drive voltage.

Further reference is had to claim 12, in which appellants further detail the relative "value" of the bias voltage. That is, the value of the "negative" bias voltage does not exceed a value that would flip the polarity of the actuator.

The differences between the prior art and the claimed invention are stark. The prior art of record does not fairly suggest the invention. We once more emphasize that a piezoelectric actuator, following its production and not yet being subjected to any voltage, already has a given polarity.

It is an essential difference between:

Kuwajima, where a bias voltage is applied during the operation of the piezoelectric actuator and, starting from the resulting reference position, to apply a further voltage, either in the same direction as the bias voltage or opposite the bias voltage (!! please do not confuse this with a polarity reversal !!);

and

the claimed invention, where a piezoelectric actuator is provided with an hydraulic bearing for play compensation and where, first, a bias voltage is applied opposite the polarization of the piezoelectric actuator, the hydraulic bearing is slightly expanded and, second, the usual drive voltage is then applied in the proper polarization direction in order to achieve an increase in the stroke amplitude.

It is important in the context of the invention to view the electrical drive process in combination with the hydraulic bearing. On the one hand, the hydraulic bearing serves as a play compensator and in a fast switching operation, on the other hand, it serves as a "hard" support bearing.

We respectfully submit that the claims are patentable over the art of record. A favorable response by the participants of the Pre-Appeal Brief Conference is respectfully solicited.

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WHS:sc - April 30, 2009
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